

Remarks

Claims 1-18, 21-23, 41-50, and 52-81 are pending in the application. Claims 19-20, 24-40, and 51 have been canceled. Claims 1-3, 23, 41, 59-62, 68-69 have been amended. New claims 80-81 have been added. The payment for the IDS for references that were not previously considered is attached. Applicant respectfully requests that they now be considered. The corrected drawings required by the Examiner are attached. The specification has been amended to remove the language the Examiner considered to be new matter and to replace it with additional description of the drawings. No new matter has been added by virtue of this amendment. Reconsideration of the application as amended is requested.

Entry of the Present Amendment

Applicant requests entry of the present amendment after final. Applicant has replaced the negative limits of the prior amendment with positive limits that are provided in the application and drawings as filed. No new matter or new issues are presented by virtue of this amendment. The amendment bring the claims into form for allowance.

IDS

The Examiner states that the IDS filed 6/20/03 fails to comply with 37 CFR 1.97(c) because it lacks the fee set forth in 37 CFR 1.17(p). Applicant is paying the fee which is attached to this amendment. Applicant requests that these references now be considered by the Examiner.

Drawings

The Examiner states that the drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because of the labeling of FIGS. 8a and 8b. Applicant included new formal drawings properly labeling FIGS. 8a and 8b in a preliminary amendment filed on June 15, 2001. A copy of this amendment with the corrected drawings is attached for the convenience of the Examiner. Applicant requests that these drawings be entered in the case. Applicant thanks the examiner for stating that the proposed drawing correction of Figures 1a and 1b that was submitted on 6/20/03 is approved. Applicant believes that the drawings submitted on 6/20/03 are formal drawings and asks that they be accepted as corrected drawings. Additional copies are attached.

Response to Amendment

The Examiner notes that canceled claims 19 and 20, having been canceled, cannot be reinstated. New claims 80 and 81 corresponding to canceled claims 19 and 20 are included in this amendment to replace claims 19 and 20.

The Examiner objects to the amendments to the disclosure filed on 6/20/03 and 7/11/03 as introducing new matter into the disclosure. The matter identified by the Examiner has been removed and replaced with additional description of the drawings.

Claim Rejections--35 U.S.C. § 112 first paragraph

The Examiner rejects claims 1-18, 21, 22, and 41-50, 52-58, 77, and 79 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The claims have been amended to remove the matter objected to by the Examiner.

Claim Rejections--35 U.S.C. § 102(b)

The Examiner rejects claims 1-4, 6, 10, 12, 14-18, 21, 23, 41-44, 49, 52, 55, 56, 59-62, 64, 68, 70, 72-79 under 35 U.S.C. § 102(b), as being anticipated by Watanabe.

Claim 1, as amended, provides:

1. A method for megasonic cleaning a substrate, comprising the steps of:
 - a) providing a container having side walls on all sides of said container, **said container having an overflow;**
 - b) providing a first megasonic transducer with a first active surface or a first array of megasonic transducers with a first array active surface for providing vibrational energy in said container;
 - c) disposing a **substrate in said container within said sidewalls, below said overflow,** and substantially parallel to and spaced a first spacing from said first active surface or from said first array active surface;
 - d) flowing a fluid through said first spacing;
 - e) immersing the substrate in said fluid in said container, **wherein said fluid flows over said overflow;** and

- f) applying energy to said first megasonic transducer or to said first array of megasonic transducers to provide vibration in said fluid and to clean the substrate wherein substantially all vibration provided in said fluid is from said first megasonic transducer, from said first array of megasonic transducers or from transducers arranged parallel to said first active surface or parallel to said first array active surface.

Watanabe does not teach or suggest “providing a container having side walls on all sides of **said container, said sidewalls having an overflow,**” as provided in claim 1, as amended. Watanabe provides a high pressure fluid flow through a straight pipe in which the substrate is located. Watanabe does not provide a container having sidewalls. Nor does Watanabe teach or suggest “disposing a substrate in said container **within said sidewalls, below said overflow.**” Nor does Watanabe teach or suggest “immersing the substrate in said fluid in said container, **wherein said fluid flows over said overflow.**” All of these elements would defeat the purpose of Watanabe, which is (1) to provide a way to introduce the substrate into bath 5 and (2) to provide pressurized liquid 5 flowing at high speed over the substrate so as to clean the substrate by action of the megasonic vibration and the fluid flow. Further invention would be needed by Watanabe to provide a way to introduce substrate 1 if the sidewalls with the overflow located above the location of the substrate were provided. Further invention would also be needed by Watanabe to provide the high flow rate with the elevated sidewalls of the present invention. The present inventor found that such high speed fluid flow is not needed and that the substrate can be immersed in a fluid in container 205 having sidewalls with overflow 260 in which the substrate is below the overflow, as illustrated in all of the drawings of the present invention. Thus, the rejection of claim 1, and claims dependent thereon, under 35 U.S.C. § 102(b), as being anticipated by Watanabe has been traversed.

Claims 23, 41, and 59, as amended have similar limits to claim 1 and therefore the rejection of those claims and claims dependent thereon under 35 U.S.C. § 102(b), as being anticipated by Watanabe has also been traversed.

Claim Rejections--35 U.S.C. § 103(a)

The Examiner rejects claims 5, 11, 45, 63, and 69 under 35 U.S.C. § 103(a), as being unpatentable over Watanabe.

However, applicant would respectfully ask the Examiner to consider that since the independent claims, as amended, are clearly distinguished from Watanabe, these dependent claims are also clearly distinguished from Watanabe.

Therefore the rejection of claims 5, 11, 45, 63, and 69 under 35 U.S.C. § 103(a), as being unpatentable over Watanabe has been traversed.

The Examiner rejects claims 7-9, 46-48, 50, 57, and 65-67 under 35 U.S.C. § 103(a), as being unpatentable over Watanabe in view of JP 5-13396.

However, applicant would respectfully ask the Examiner to consider that providing the vertical sidewalls of JP 5-13396 in the invention of Watanabe would defeat two purposes of Watanabe. First, to get substrate 1 in and out of bath 4 and second to provide unimpeded flow of liquid 5. The vertical sidewalls of JP 5-13396 would provide substantial interference with both of these purposes. Further invention would be required to combine the references to provide the vertical sidewalls of JP 5-13396 in Watanabe while still allowing substrate 1 to enter and leave and while avoiding interference with fluid flow. Thus, it would not be obvious to provide teaching about power levels from JP 5-13396 in Watanabe.

Furthermore, as to claims 7, 8, 46, 47, 65 and 66, JP 5-13396 only teaches a power density, not the maximum power provided in claims 7, 46, and 65 or the percent of maximum power provided in claims 8, 47, and 66.

Furthermore, as to the vertical orientation of wafers or active surface provided in claims 50 and 57, such an orientation would also defeat the teachings of Watanabe since Watanabe requires high speed flow of fluid past the surface of the wafer being cleaned.

Therefore the rejection of claims 7-9, 46-48, 50, 57, and 65-67 under 35 U.S.C. § 103(a), as being unpatentable over Watanabe in view of JP 5-13396 has been traversed.

The Examiner rejects claims 13, 22, 54, 58, and 71 under 35 U.S.C. § 103(a), as being unpatentable over Watanabe in view of any one of Dussault (4,979,994 and 5,037,208) and Ogata. The Examiner acknowledges that "Watanabe et al do not specifically teach that the transducers are completely immersed."

However, applicant would respectfully ask the Examiner to consider that providing tank 24 of Dussault's 4,979,994 patent (see abstract, col. 4, lines 33-36 and FIGS. 3-6) would defeat the purpose of Watanabe. As described herein above, the teachings of Watanabe are incompatible with a tank configuration where the tank has sidewalls and the fluid flows over the sidewalls. Such elevated sidewalls would interfere with introducing substrate 1 into bath 4 as desired by Watanabe. In addition such sidewalls would provide interference with the high speed flow of fluid past the surface of the object to be cleaned. Patent 5,037,208, which is a divisional of 4,979,994, has similar teaching to the 4,979,994 patent. Ogata also teaches cleaning bath 3 with spraying holes 8a and 8b on both sides of product to be cleaned 2. With fluid flow from both directions there would be no high speed flow of fluid as required in Watanabe. Watanabe would be defeated by including the structure of Ogata since he would not be able to obtain his high speed flow past the part to be cleaned. Instead of a smooth pipe for bath 4 in Watanabe, there would be the transducers in the path blocking the way and obstructing flow. With

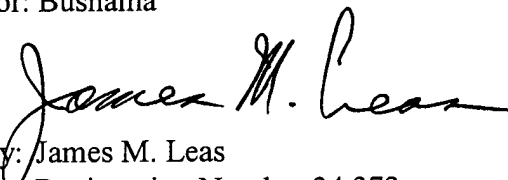
his high speed flow such blocks could effect the flow pattern, introducing turbulence. There might not be a uniform flow giving the cleaning uniformity desired. Further invention would be required to overcome these difficulties to adapt any of the tank embodiments to the teachings of Watanabe. Thus, it would not be obvious how to combine the teachings of any of these references with the teaching of Watanabe. Since these tank embodiments degrade performance desired by Watanabe it would not be obvious to use them.

Furthermore, applicant would respectfully ask the Examiner to consider that Watanabe provides specifications for his high speed flow. Immersing the transducers where they would interfere with the flow would conflict with achieving those specifications. Thus, it would not be obvious to move the transducers into the fluid flow path.

Therefore the rejection of claims 13, 22, 54, 58, and 71 under 35 U.S.C. § 103(a), as being unpatentable over Watanabe in view of any one of Dussault (4,979,994 and 5,037,208) and Ogata has been traversed.

It is believed that the claims are in condition for allowance. Therefore, applicant respectfully requests favorable reconsideration. If there are any questions please call applicant's agent at 802 864-1575.

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